

**TABLE 1**  
**SAMPLING AND ANALYSIS PLAN**  
**UPLAND REMEDIAL INVESTIGATION WORK PLAN**  
**FORMER R.G. HALEY INTERNATIONAL CORPORATION SITE**

Sampling Area	Sample Matrix	Type of Exploration	Number of Explorations	Exploration Location <sup>1</sup>	Approx. Number of Samples Analyzed/Exploration	Sample Depth	Type and Number of Chemical Analyses <sup>2</sup>						
							SVOCs <sup>3</sup>	Petroleum Hydrocarbons			PCDDs/PCDFs <sup>7</sup>	Metals <sup>8</sup>	
								Diesel and Lube Oil <sup>4</sup>	EPH <sup>5</sup>	BETX <sup>6</sup>			
Upland	Soil (shallow)	Hand auger	8	Unpaved areas	1	0 - 12 inches	8	8	2	4	4	--	--
	Soil (deeper)	Boring completed only for soil sampling	20	Dispersed locations on site	1.5	Primarily at groundwater table	12	30	3			1	--
		Boring completed for monitoring well construction	11	Dispersed locations on-site	1.5		11	16	3			--	--
			2	Cornwall site	2		2	4	1			--	--
		Test pit	3	Wood treatment facilities	1		3	3	1			1	--
	Ground-water <sup>10</sup>	Monitoring well (existing and proposed)	17	Dispersed locations on-site	1	Shallow groundwater	17	17	6	4	4	2 <sup>11</sup>	17
			7	Cornwall site	1	Shallow groundwater	7	7	--	--	--	--	7
	Free product	Four monitoring wells/ one UST	NA	Product plume and UST	NA	NA	3	3	--	--	3	--	--
Intertidal Zone	Soil (deeper)	Boring completed only for soil sampling	1	Beach face between shoreline bluff and low tide line	1	Based on field screening results	1	1	--	--	--	--	--
		Boring completed for monitoring well construction	4		1	Based on field screening results	4	4	--	--	1	--	--
	Ground-water <sup>10</sup>	Monitoring well	4		1	Shallow groundwater	4	4	4	4	1	--	4

Notes appear on page 2 of 2

## TABLE 1 (Page 2 of 2)

## Notes:

- <sup>1</sup> Exploration locations are shown in Figures 13 and 14.
  - <sup>2</sup> The number of analyses shown does not include chemical analyses that will be completed for quality assurance/quality control (QA/QC) purposes.
  - <sup>3</sup> Semivolatile organic compounds (SVOCs), including chlorinated phenols and polycyclic aromatic hydrocarbons (PAHs), using EPA Method 8270C.
  - <sup>4</sup> Diesel- and heavy oil-range hydrocarbons using Ecology Method NWTPH-Dx (with silica gel cleanup). Samples will be selected for this analysis based on field screening results.
  - <sup>5</sup> Extractable petroleum hydrocarbons (EPH) using Ecology-specified methodology. Samples will be selected for this analysis based on field screening results.
  - <sup>6</sup> Benzene, ethylbenzene, toluene and xylenes (BTEX) using EPA Method 8021. Samples will be selected for this analysis based on field screening results.
  - <sup>7</sup> Polychlorinated dibenzo-p-dioxins (PCDDs) and dibenzofurans (PCDFs) using EPA Method 8290. Soil samples will be selected for this analysis based on analytical results for other constituents, sample location and/or field observations.
  - <sup>8</sup> Metals (arsenic, total chromium, hexavalent chromium and copper) using EPA Methods 6000/7000 Series.
  - <sup>9</sup> Natural attenuation parameters will be initially measured in all monitoring wells from which groundwater samples are submitted for chemical analysis. The number of wells in which these parameters are measured will be revised based on the results of the first monitoring event. See Table 2 for a complete list of natural attenuation parameters.
  - <sup>10</sup> Four quarterly groundwater monitoring events will be conducted. The number of groundwater analyses shown represents only one of the four monitoring events. The specific monitoring wells from which groundwater samples will be obtained and submitted for analysis are summarized in Section 8.2.2. The scope of the second, third and fourth monitoring reduced based on analytical results from the first monitoring event.
  - <sup>11</sup> Groundwater samples will be submitted for analysis of dissolved metals (one-time sampling event).
- Note: additional testing will be conducted to enable the calculation of site-specific soil cleanup levels, including soil pH, bulk density, porosity, volumetric water content and fraction of organic carbon (foc).
- UST = underground storage tank
- NA = not applicable or not determined at this time
- = analytical testing not planned

**TABLE 2**  
**GROUNDWATER PARAMETERS FOR EVALUATING NATURAL ATTENUATION**  
**UPLAND REMEDIAL INVESTIGATION WORK PLAN**  
**FORMER R.G. HALEY INTERNATIONAL CORPORATION SITE**

Analysis	Method/Reference	Comments	Data Use	Method of Testing
Dissolved Oxygen (Q)	Horiba-U-22, Water Quality Checker	Proper equipment calibration required daily.	Concentrations of <0.5 mg/L generally indicate an anoxic pathway.	Field equipment
Nitrate (NO <sub>3</sub> )	EPA Method 353.2	Can be done in the field but analysis by a fixed-based laboratory is recommended.	Substrate for microbial respiration if oxygen is depleted.	Laboratory
Soluble Manganese [Mn(II)]	Hach DR/2010 Spectrophotometer	Filter if turbidity interferes with analysis.	May indicate an anoxic degradation process due to depletion of oxygen and nitrate.	Field equipment
Ferrous Iron [Fe(II)]	Hach DR/2010 Spectrophotometer	Filter if turbidity interferes with analysis.	May indicate an anoxic degradation process due to depletion of oxygen, nitrate and manganese.	Field equipment
Sulfate (SO <sub>4</sub> <sup>2-</sup> )	EPA Method 300.0	Can be done in the field but analysis by a fixed-based laboratory is recommended.	Substrate for anoxic microbial respiration.	Laboratory
Dissolved Inorganic Carbon	EPA Method 415.1	Laboratory-only	Dissolved inorganic carbon is a byproduct of organic carbon oxidation and indicates the difference in microbial oxidation processes inside versus outside a contaminant plume.	Laboratory
Total Organic Carbon	EPA Method 415.1	Laboratory-only	To determine the potential for reductive dechlorination.	Laboratory
Oxidation/reduction potential (ORP)	Horiba-U-22, Water Quality Checker	Measurements made with electrodes and meter; protect samples from oxygen. Report results against the hydrogen electrode (Eh) by adding a correction factor specific to the electrode used.	The ORP of groundwater reflects the relative oxidizing or reducing nature of the groundwater system. ORP is influenced by the nature of the biologically mediated degradation of contaminants and may range from 800 millivolts (mV) (oxygenated) to less than -400 mV (strongly reducing).	Field equipment
pH	Horiba-U-22, Water Quality Checker	Field-only.	Aerobic and anoxic processes are pH-sensitive.	Field equipment

**Notes:**

North Creek Analytical will be the fixed-base laboratory used for the analysis of natural attenuation parameters.

**TABLE 3**  
**PROPOSED PROJECT SCHEDULE**  
**UPLAND REMEDIAL INVESTIGATION WORK PLAN**  
**FORMER R.G. HALEY INTERNATIONAL CORPORATION SITE**

Activity	Date
Prepare for field work - this includes locating subsurface utilities, logistical planning, scheduling subcontractors and GeoEngineers' staff, and conducting field briefs.	Begin within one week of receiving work plan approval from Ecology. This work will be completed approximately two weeks after beginning.
Complete subsurface explorations and obtain all soil, groundwater and free product samples described in Table 1.	Begin field activities approximately three weeks after receiving work plan approval from Ecology. Exploration and sampling activities will be completed approximately three weeks after beginning field work.
Compile and validate analytical data.	Complete six weeks after last analytical results are received.
Evaluate data and prepare Draft Remedial Investigation Report.	Complete draft report two months after compiling and validating analytical data.

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**TABLE 4**  
**KEY PERSONNEL**  
**UPLAND REMEDIAL INVESTIGATION WORK PLAN**  
**FORMER R.G. HALEY INTERNATIONAL CORPORATION SITE**

Position	Name	Affiliation	Telephone Number
Ecology Site Manager	Glynis Carrosino	Washington State Department of Ecology	425-649-7263
Property Owner - Former R.G. Haley Property	Everett Billingslea	Douglas Management Company	206-439-5490
Representatives of State-Owned Property	Chad Unland	Washington State Department of Natural Resources	360-854-2835
	Amy Kurtenbach	Washington State Department of Natural Resources	360-902-1029
Legal Counsel to Douglas Management	Charles Blumenfeld	Perkins Coie	206-264-6364
Principal-in-Charge	Jim Miller	GeoEngineers, Inc.	425-861-6063
Project Manager	Steve Woodward	GeoEngineers, Inc.	206-728-2674
Field Coordinator	Brick Spangler	GeoEngineers, Inc.	425-861-6012
Quality Assurance Leader	Rob Smith	GeoEngineers, Inc.	253-383-4940
Chemical Analytical Laboratory QA/QC Coordinator	Greg Salata	Columbia Analytical Services	360-577-7222
	Jeff Gerdes	North Creek Analytical	425-420-9234

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**TABLE 5**  
**TARGET DETECTION LIMITS**  
**UPLAND REMEDIAL INVESTIGATION WORK PLAN**  
**FORMER R.G. HALEY INTERNATIONAL CORPORATION SITE**

<b>Analysis Type</b>	<b>CASRN</b>	<b>Analyte</b>	<b>Soil</b>				<b>Water</b>			
			<b>Method</b>	<b>TDL</b>	<b>PQL</b>	<b>Units</b>	<b>Method</b>	<b>TDL</b>	<b>PQL</b>	<b>Units</b>
Extractable Petroleum Hydrocarbons	na	C8 through C34	Ecology EPH	--	5	mg/kg	Ecology EPH	--	50	ug/L
Total Petroleum Hydrocarbons	68334-30-5	Diesel-Range	NWTPH-Dx	2000	25	mg/kg	NWTPH-Dx	--	250	ug/L
Total Petroleum Hydrocarbons	na	Lube Oil-Range	NWTPH-Dx	2000	25	mg/kg	NWTPH-Dx	--	250	ug/L
BETX	71-43-2	Benzene	SW-846 8260B	0.03	0.005	mg/kg	SW-846 8260B	23	0.5	ug/L
BETX	100-41-4	Ethylbenzene	SW-846 8260B	6	0.005	mg/kg	SW-846 8260B	6914	0.5	ug/L
BETX	108-88-3	Toluene	SW-846 8260B	7	0.005	mg/kg	SW-846 8260B	48460	0.5	ug/L
BETX	1330-20-7	Xylenes (total)	SW-846 8260B	9	0.005	mg/kg	SW-846 8260B	--	0.5	ug/L
SVOCs	935-95-5	2,3,5,6-Tetrachlorophenol	SW-846 8270C	--	2	mg/kg	SW-846 8270C-LVI	--	1	ug/L
SVOCs	88-06-2	2,4,6-Trichlorophenol	SW-846 8270C	91	2	mg/kg	SW-846 8270C-LVI	3.9	1	ug/L
SVOCs	91-57-6	2-Methylnaphthalene	SW-846 8270C	na	0.3	mg/kg	SW-846 8270-SIM	--	0.02	ug/L
SVOCs	83-32-9	Acenaphthene	SW-846 8270C	4800	0.3	mg/kg	SW-846 8270-SIM	643	0.02	ug/L
SVOCs	208-96-8	Acenaphthylene	SW-846 8270C	na	0.3	mg/kg	SW-846 8270-SIM	--	0.02	ug/L
SVOCs	120-12-7	Anthracene	SW-846 8270C	24000	0.3	mg/kg	SW-846 8270-SIM	25926	0.02	ug/L
SVOCs	56-55-3	Benzo(a)anthracene	SW-846 8270C	0.14	0.1	mg/kg	SW-846 8270-SIM	0.030	0.02	ug/L
SVOCs	50-32-8	Benzo(a)pyrene	SW-846 8270C	0.10	0.1	mg/kg	SW-846 8270-SIM	0.030	0.02	ug/L
SVOCs	205-99-2	Benzo(b)fluoranthene	SW-846 8270C	0.14	0.1	mg/kg	SW-846 8270-SIM	0.030	0.02	ug/L
SVOCs	191-24-2	Benzo(g,h,i)perylene	SW-846 8270C	na	0.3	mg/kg	SW-846 8270-SIM	--	0.02	ug/L
SVOCs	207-08-9	Benzo(k)fluoranthene	SW-846 8270C	0.14	0.1	mg/kg	SW-846 8270-SIM	0.030	0.02	ug/L
SVOCs	218-01-9	Chrysene	SW-846 8270C	0.14	0.3	mg/kg	SW-846 8270-SIM	0.030	0.02	ug/L
SVOCs	132-64-9	Dibenzofuran	SW-846 8270C	na	0.3	mg/kg	SW-846 8270-SIM	--	0.02	ug/L
SVOCs	206-44-0	Fluoranthene	SW-846 8270C	3200	0.3	mg/kg	SW-846 8270-SIM	90	0.02	ug/L
SVOCs	86-73-7	Fluorene	SW-846 8270C	3200	0.3	mg/kg	SW-846 8270-SIM	3457	0.02	ug/L
SVOCs	193-39-5	Indeno(1,2,3-cd)pyrene	SW-846 8270C	0.14	0.3	mg/kg	SW-846 8270-SIM	0.030	0.02	ug/L
SVOCs	91-20-3	Naphthalene	SW-846 8270C	5	0.3	mg/kg	SW-846 8270-SIM	4938	0.02	ug/L
SVOCs	86-30-6	N-Nitrosodiphenylamine	SW-846 8270C	204	0.3	mg/kg	SW-846 8270C-LVI	9.7	0.2	ug/L
SVOCs	87-86-5	Pentachlorophenol	SW-846 8270C	8.3	2	mg/kg	SW-846 8270C-LVI	2.2	1	ug/L
SVOCs	85-01-8	Phenanthrene	SW-846 8270C	na	0.3	mg/kg	SW-846 8270-SIM	6.3	0.02	ug/L
SVOCs	129-00-0	Pyrene	SW-846 8270C	2400	0.3	mg/kg	SW-846 8270-SIM	2593	0.02	ug/L
PCDDs/PCDFs	1746-01-6	2378-TCDD	SW-846 8290	6.7	1	ng/kg	SW-846 8290	0.0086	10	pg/L
PCDDs/PCDFs	40321-76-4	12378-PeCDD	SW-846 8290	na	2.5	ng/kg	SW-846 8290	--	25	pg/L
PCDDs/PCDFs	57653-85-7	123678-HxCDD	SW-846 8290	na	2.5	ng/kg	SW-846 8290	--	25	pg/L
PCDDs/PCDFs	39227-28-6	123478-HxCDD	SW-846 8290	na	2.5	ng/kg	SW-846 8290	--	25	pg/L
PCDDs/PCDFs	19408-74-3	123789-HxCDD	SW-846 8290	160	2.5	ng/kg	SW-846 8290	--	25	pg/L
PCDDs/PCDFs	35822-46-9	1234678-HpCDD	SW-846 8290	na	2.5	ng/kg	SW-846 8290	--	25	pg/L
PCDDs/PCDFs	3268-87-9	OCDD	SW-846 8290	na	5	ng/kg	SW-846 8290	--	50	pg/L
PCDDs/PCDFs	51207-31-9	2378-TCDF	SW-846 8290	na	1	ng/kg	SW-846 8290	--	10	pg/L
PCDDs/PCDFs	57117-41-6	12378-PeCDF	SW-846 8290	na	2.5	ng/kg	SW-846 8290	--	25	pg/L
PCDDs/PCDFs	57117-31-4	23478-PeCDF	SW-846 8290	na	2.5	ng/kg	SW-846 8290	--	25	pg/L
PCDDs/PCDFs	57117-44-9	123678-HxCDF	SW-846 8290	na	2.5	ng/kg	SW-846 8290	--	25	pg/L
PCDDs/PCDFs	72918-21-9	123789-HxCDF	SW-846 8290	na	2.5	ng/kg	SW-846 8290	--	25	pg/L
PCDDs/PCDFs	70648-26-9	123478-HxCDF	SW-846 8290	na	2.5	ng/kg	SW-846 8290	--	25	pg/L
PCDDs/PCDFs	60851-34-5	234678-HxCDF	SW-846 8290	na	2.5	ng/kg	SW-846 8290	--	25	pg/L
PCDDs/PCDFs	67562-39-4	1234678-HpCDF	SW-846 8290	na	2.5	ng/kg	SW-846 8290	--	25	pg/L
PCDDs/PCDFs	55673-89-7	1234789-HpCDF	SW-846 8290	na	2.5	ng/kg	SW-846 8290	--	25	pg/L
PCDDs/PCDFs	39001-02-0	OCDF	SW-846 8290	na	5	ng/kg	SW-846 8290	--	50	pg/L
Metals	7440-38-2	Arsenic	SW-846 6020	0.667	0.5	mg/kg	SW-846 6020	0.098	0.05	ug/L
Metals	7440-47-3	Chromium (total)	SW-846 6020	na	0.5	mg/kg	SW-846 6020	50	1.0	ug/L
Metals	18540-29-9	Chromium (hexavalent)	SW-846 7196A	240	1	mg/kg	SW-846 7196A	50	5.0	ug/L
Metals	7440-50-8	Copper	SW-846 6020	na	0.5	mg/kg	SW-846 6020	2.4	1.0	ug/L
Water Quality	na	Nitrate	na	na	na	na	EPA-353.2	na	0.01	m/L
Water Quality	14808-79-8	Sulfate	na	na	na	na	EPA-300.0	na	0.4	m/L
Water Quality	na	Total Organic Carbon	na	na	na	na	EPA-415.1	na	2	m/L
Water Quality	na	Disolved Inorganic Carbon	na	na	na	na	EPA-415.1	na	2	m/L

NOTES:
TDL = Target Detection Limit
PQL = Practical Quantitation Limit
CASRN = Chemical Abstracts Service Registry Number
TDL = Target Detection Limit
BETX= Benzene, Ethylbenzene, Toluene, Xylene:
SVOCs= Semivolatile Organic Compounds
PCDDs=Polychlorinated Dibenzo-p-dioxin:
PCDFs=Polychlorinated Dibenzofuran:
mg/kg = milligrams per kilogram
ug/L = micrograms per liter
pg/L = picograms per liter
ng/kg = nanograms per kilogram
-- = no value available
na = not applicable

**TABLE 6**  
**SURROGATE SPIKE PERCENT RECOVERY LIMITS**  
**UPLAND REMEDIAL INVESTIGATION WORK PLAN**  
**FORMER R.G. HALEY INTERNATIONAL CORPORATION SITE**

Analysis Type	Method	Analyte	Water (%)	Soil (%)
TPH	NWTPH-Dx	o-Terphenyl	50-150	50-150
BETX	SW-846 8260B	Toluene-D8	87-118	32-166
BETX	SW-846 8260B	Dibromofluoromethane	78-124	41-152
BETX	SW-846 8260B	4-Bromofluorobenzene	81-113	40-153
SVOCs	SW-846 8270C	2-Fluorophenol	37-101	38-89
SVOCs	SW-846 8270C	Phenol-D6	40-109	29-111
SVOCs	SW-846 8270C	2,4,6-Tribromophenol	44-129	48-111
SVOCs	SW-846 8270C	Nitrobenzene-D5	49-108	46-103
SVOCs	SW-846 8270C	2-Fluor biphenyl	56-104	53-106
SVOCs	SW-846 8270C	Terphenyl	22-140	33-139
SVOCs	SW-846 8270C-SIM	Fluorene-D10	31-97	NA
SVOCs	SW-846 8270C-SIM	Fluoranthene-D10	31-113	NA
SVOCs	SW-846 8270C-SIM	Terphenyl-D14	30-115	NA
PCDDs/PCDFs	SW-846 8290	13-C-2,3,7,8-Tetrachlorodibenzo-p-dioxin	40-135	40-135
PCDDs/PCDFs	SW-846 8290	13-C-1,2,3,7,8-Pentachlorodibenzo-p-dioxins	40-135	40-135
PCDDs/PCDFs	SW-846 8290	13-C-1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	40-135	40-135
PCDDs/PCDFs	SW-846 8290	13C-1,2,3,4,6,7,8,-Heptachlorodibenzo-p-dioxin	40-135	40-135
PCDDs/PCDFs	SW-846 8290	13C-1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin	40-135	40-135
PCDDs/PCDFs	SW-846 8290	13C-2,3,7,8-Tetrachlorodibenzofuran	40-135	40-135
PCDDs/PCDFs	SW-846 8290	13C-1,2,3,7,8-Pentachlorodibenzofuran	40-135	40-135
PCDDs/PCDFs	SW-846 8290	13C-1,2,3,4,7,8-Hexachlorodibenzofuran	40-135	40-135
PCDDs/PCDFs	SW-846 8290	13C-1,2,34,6,7,8-Heptachlorodibenzofuran	40-135	40-135
PCDDs/PCDFs	SW-846 8290	13C-1,2,3,4,6,7,8,9-Octachlorodibenzofuran	40-135	40-135
PCDDs/PCDFs	SW-846 8290	37Cl-2,3,7,8-Tetrachlorodibenzo-p-dioxin	50-150	50-150

**NOTES:**

TPH = Total Petroleum Hydrocarbons  
 BTEX = Benzene, Toluene, Ethylbenzene, Xylenes  
 SVOCs = Semivolatile Organic Compounds  
 PCDDs=Polychlorinated Dibenzo-p-dioxins  
 PCDFs=Polychlorinated Dibenzofurans

**TABLE 7**  
**MATRIX SPIKE PERCENT RECOVERY LIMITS**  
**UPLAND REMEDIAL INVESTIGATION WORK PLAN**  
**FORMER R.G. HALEY INTERNATIONAL CORPORATION SITE**

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Analysis Type	Method	Analyte	Water (%)	Soil (%)
BETX	SW-846 8260B	Benzene	76-138	56-124
BETX	SW-846 8260B	Ethylbenzene	76-139	19-156
BETX	SW-846 8260B	Toluene	82-131	34-141
BETX	SW-846 8260B	m&p-Xylenes	86-130	18-148
BETX	SW-846 8260B	o-Xylene	82-134	14-166
TPH	NWTPH-Dx	Diesel-Range	50-150	50-150
TPH	NWTPH-Dx	Lube Oil-Range	50-150	50-150
SVOCs	SW-846 8270C	2,3,5,6-Tetrachlorophenol	32-135	30-129
SVOCs	SW-846 8270C	2,4,6-Trichlorophenol	57-112	56-96
SVOCs	SW-846 8270C-SIM	2-Methylnaphthalene	33-96	41-93
SVOCs	SW-846 8270C-SIM	Acenaphthene	34-99	49-100
SVOCs	SW-846 8270C-SIM	Acenaphthylene	39-104	57-105
SVOCs	SW-846 8270C-SIM	Anthracene	24-111	49-118
SVOCs	SW-846 8270C-SIM	Benzo(a)anthracene	14-125	53-106
SVOCs	SW-846 8270C-SIM	Benzo(a)pyrene	19-126	47-122
SVOCs	SW-846 8270C-SIM	Benzo(b)fluoranthene	16-124	33-132
SVOCs	SW-846 8270C-SIM	Benzo(g,h,i)perylene	15-119	39-124
SVOCs	SW-846 8270C-SIM	Benzo(k)fluoranthene	14-127	45-117
SVOCs	SW-846 8270C-SIM	Chrysene	16-117	44-114
SVOCs	SW-846 8270C-SIM	Dibenzofuran	16-110	45-103
SVOCs	SW-846 8270C-SIM	Fluoranthene	16-121	45-110
SVOCs	SW-846 8270C-SIM	Fluorene	36-105	43-111
SVOCs	SW-846 8270C-SIM	Indeno(1,2,3-cd)pyrene	10-137	50-112
SVOCs	SW-846 8270C-SIM	Naphthalene	30-97	33-110
SVOCs	SW-846 8270C	N-Nitrosodiphenylamine	70-130	70-130
SVOCs	SW-846 8270C	Pentachlorophenol	57-112	30-129
SVOCs	SW-846 8270C-SIM	Phenanthrene	31-106	44-106
SVOCs	SW-846 8270C-SIM	Pyrene	70-130	21-136
PCDDs/PCDFs	SW-846 8290	2378-TCDD	50-150	50-150
PCDDs/PCDFs	SW-846 8290	12378-PeCDD	50-150	50-150
PCDDs/PCDFs	SW-846 8290	123678-HxCDD	50-150	50-150
PCDDs/PCDFs	SW-846 8290	123478-HxCDD	50-150	50-150
PCDDs/PCDFs	SW-846 8290	123789-HxCDD	50-150	50-150
PCDDs/PCDFs	SW-846 8290	1234678-HpCDD	50-150	50-150
PCDDs/PCDFs	SW-846 8290	OCDD	50-150	50-150
PCDDs/PCDFs	SW-846 8290	2378-TCDF	50-150	50-150
PCDDs/PCDFs	SW-846 8290	12378-PeCDF	50-150	50-150
PCDDs/PCDFs	SW-846 8290	23478-PeCDF	50-150	50-150
PCDDs/PCDFs	SW-846 8290	123678-HxCDF	50-150	50-150
PCDDs/PCDFs	SW-846 8290	123789-HxCDF	50-150	50-150
PCDDs/PCDFs	SW-846 8290	123478-HxCDF	50-150	50-150
PCDDs/PCDFs	SW-846 8290	234678-HxCDF	50-150	50-150
PCDDs/PCDFs	SW-846 8290	1234678-HpCDF	50-150	50-150
PCDDs/PCDFs	SW-846 8290	1234789-HpCDF	50-150	50-150
PCDDs/PCDFs	SW-846 8290	OCDF	50-150	50-150
Metals	SW-846 6020	Arsenic	75-125	72-130
Metals	SW-846 6020	Chromium (total)	50-150	50-150
Metals	SW-846 7196A	Chromium (hexavalent)	50-150	50-150
Metals	SW-846 6020	Copper	70-124	59-136
Water Quality	EPA-353.2	Nitrate	36-150	na
Water Quality	EPA-300.0	Sulfate	58-135	na
Water Quality	EPA-415.1	Total Organic Carbon	70-125	na
Water Quality	EPA-415.1	Disolved Inorganic Carbon	70-125	na

**NOTES:**

BETX = Benzene, Ethylbenzene, Toluene, Xylenes

TPH = Total Petroleum Hydrocarbon

SVOCs = Semivolatile Organic Compounds

PCDDs = Polychlorinated Dibenzo-p-dioxins

PCDFs= Polychlorinated Dibenzofurans

na = Not applicable because analysis will be completed for groundwater only.

**TABLE 8**  
**LABORATORY CONTROL SPIKE PERCENT RECOVERY LIMITS**  
**UPLAND REMEDIAL INVESTIGATION WORK PLAN**  
**FORMER R.G. HALEY INTERNATIONAL CORPORATION SITE**

Analysis Type	Method	Analyte	Water	Soil
BETX	SW-846 8260B	Benzene	90-120	84-115
BETX	SW-846 8260B	Ethylbenzene	89-124	78-125
BETX	SW-846 8260B	Toluene	89-119	80-119
BETX	SW-846 8260B	m&p-Xylenes	90-122	74-122
BETX	SW-846 8260B	o-Xylene	88-126	76-123
TPH	NWTPH-Dx	Diesel-Range	50-150	50-150
TPH	NWTPH-Dx	Lube Oil-Range	50-150	50-150
SVOCs	SW-846 8270C	2,3,5,6-Tetrachlorophenol	26-123	52-104
SVOCs	SW-846 8270C	2,4,6-Trichlorophenol	53-113	58-100
SVOCs	SW-846 8270C-SIM	2-Methylnaphthalene	26-110	53-91
SVOCs	SW-846 8270C-SIM	Acenaphthene	41-97	58-98
SVOCs	SW-846 8270C-SIM	Acenaphthylene	44-103	62-111
SVOCs	SW-846 8270C-SIM	Anthracene	45-104	56-112
SVOCs	SW-846 8270C-SIM	Benzo(a)anthracene	50-111	64-108
SVOCs	SW-846 8270C-SIM	Benzo(a)pyrene	51-119	71-111
SVOCs	SW-846 8270C-SIM	Benzo(b)fluoranthene	54-114	66-110
SVOCs	SW-846 8270C-SIM	Benzo(g,h,i)perylene	44-115	56-118
SVOCs	SW-846 8270C-SIM	Benzo(k)fluoranthene	51-117	65-110
SVOCs	SW-846 8270C-SIM	Chrysene	51-108	62-107
SVOCs	SW-846 8270C-SIM	Dibenzofuran	17-130	60-96
SVOCs	SW-846 8270C-SIM	Fluoranthene	51-112	57-114
SVOCs	SW-846 8270C-SIM	Fluorene	46-102	61-99
SVOCs	SW-846 8270C-SIM	Indeno(1,2,3-cd)pyrene	43-127	54-121
SVOCs	SW-846 8270C-SIM	Naphthalene	37-95	58-97
SVOCs	SW-846 8270C	N-Nitrosodiphenylamine	47-129	70-130
SVOCs	SW-846 8270C	Pentachlorophenol	26-123	52-104
SVOCs	SW-846 8270C-SIM	Phenanthrene	47-101	57-102
SVOCs	SW-846 8270C-SIM	Pyrene	45-111	56-108
PCDDs/PCDFs	SW-846 8290	2378-TCDD	70-140	70-140
PCDDs/PCDFs	SW-846 8290	12378-PeCDD	70-140	70-140
PCDDs/PCDFs	SW-846 8290	123678-HxCDD	70-140	70-140
PCDDs/PCDFs	SW-846 8290	123478-HxCDD	70-140	70-140
PCDDs/PCDFs	SW-846 8290	123789-HxCDD	70-140	70-140
PCDDs/PCDFs	SW-846 8290	1234678-HpCDD	70-140	70-140
PCDDs/PCDFs	SW-846 8290	OCDD	70-140	70-140
PCDDs/PCDFs	SW-846 8290	2378-TCDF	70-140	70-140
PCDDs/PCDFs	SW-846 8290	12378-PeCDF	70-140	70-140
PCDDs/PCDFs	SW-846 8290	23478-PeCDF	70-140	70-140
PCDDs/PCDFs	SW-846 8290	123678-HxCDF	70-140	70-140
PCDDs/PCDFs	SW-846 8290	123789-HxCDF	70-140	70-140
PCDDs/PCDFs	SW-846 8290	123478-HxCDF	70-140	70-140
PCDDs/PCDFs	SW-846 8290	234678-HxCDF	70-140	70-140
PCDDs/PCDFs	SW-846 8290	1234678-HpCDF	70-140	70-140
PCDDs/PCDFs	SW-846 8290	1234789-HpCDF	70-140	70-140
PCDDs/PCDFs	SW-846 8290	OCDF	70-140	70-140
Metals	SW-846 6020	Arsenic	75-125	80-120
Metals	SW-846 6020	Chromium (total)	80-120	80-120
Metals	SW-846 7196A	Chromium (hexavalent)	90-110	80-120
Metals	SW-846 6020	Copper	80-120	80-120
Water Quality	EPA-353.2	Nitrate	90-110	na
Water Quality	EPA-300.0	Sulfate	90-110	na
Water Quality	EPA-415.1	Total Organic Carbon	90-110	na
Water Quality	EPA-415.1	Disolved Inorganic Carbon	90-110	na

**NOTES:**

BETX = Benzene, Ethylbenzene, Toluene, Xylenes

TPH = Total Petroleum Hydrocarbon

SVOCs = Semivolatile Organic Compounds

PCDDs = Polychlorinated Dibenzo-p-dioxins

PCDFs= Polychlorinated Dibenzofurans

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**TABLE 9**  
**SAMPLE CONTAINERS, PRESERVATIVES AND HOLDING TIMES**  
**REMEDIAL INVESTIGATION WORK PLAN**  
**FORMER R.G. HALEY INTERNATIONAL CORPORATION SITE**

Analysis	Method	Minimum Sample Size		Sample Containers		Sample Preservatives		Sample Holding Time	
		Soil	Water	Soil	Water	Soil	Water	Soil	Water
BTEX	SW-846 8260B	50 g	120 mL	4 or 8 oz glass widemouth with Teflon-lined lid	3 - 40 mL VOA Vials	Cool 4 °C	HCl - pH<2	14 days to extraction, 40 days from extract to analysis	14 days
SVOCs	SW-846 8270C	50 g	1 L	4 or 8 oz glass widemouth with Teflon-lined lid	1 liter amber glass with Teflon-lined lid	Cool 4 °C	Cool 4 °C	14 days to extraction, 40 days from extract to analysis	7 days to extraction, 40 days from extract to analysis
Extractable Petroleum Hydrocarbons	Ecology EPH	10 g	1 L	4 oz amber glass widemouth with Teflon-lined lid	1 liter amber glass with Teflon-lined lid	Cool 4 °C	Cool 4 °C, HCl to pH < 2	14 days to extraction, 40 days from extract to analysis	7 days to extraction, 40 days from extract to analysis
PCDDs/PCDFs	SW-846 8290	50g	1 L	4 or 8 oz glass widemouth with Teflon-lined lid	1 liter amber glass with Teflon-lined lid	Cool 4 °C	Cool 4 °C	30 days to extraction analyzed within 45 days of extraction	30 days to extraction analyzed within 45 days of extraction
Diesel-range Hydrocarbons	NWTPH-Dx	20 g	400 mL	8 or 16 oz amber glass wide-mouth with Teflon-lined lid	1 liter amber glass with Teflon-lined lid	Cool 4 °C	Cool 4 °C, HCl to pH < 2	14 days	14 days preserved, 7 days unpreserved
Metals	SW-846 6020	100g	500mL	4 or 8 oz glass widemouth with Teflon-lined lid	1L poly bottle	Cool 4 °C	Cool 4 °C	180days	180days
Metals	SW-846 7196A	100g	250mL	4 or 8 oz glass widemouth with Teflon-lined lid	500 mL poly bottle	Cool 4 °C	Cool 4 °C	30 daysa	1 day
Dissolved Metals	SW-846 6020	NA	500mL	NA	1L poly bottle	NA	Field Filter, Cool 4 °C, HNO3 to pH < 2	NA	180days
Dissolved Metals	SW-846 7196A	NA	250mL	NA	500 mL poly bottle	NA	Field Filter, Cool 4 °C, HNO3 to pH < 2	NA	1day
Nitrate	EPA 353.2	NA	200 mL	NA	1L poly bottle	NA	Cool 4 °C	NA	48 hours
Sulfate	EPA 300.0	NA	200 mL	NA	1L poly bottle	NA	Cool 4 °C	NA	28 days
Total Organic Carbon	EPA 415.1	NA	100 mL	NA	250 mL amber bottle with teflon lid	NA	Cool 4 °C, H <sub>2</sub> SO <sub>4</sub>	NA	28 days
Disolved Inorganic Carbon	EPA 415.1	NA	200 mL	NA	1L poly bottle	NA	Cool 4 °C	NA	28 days

**NOTES:**

BTEX = Benzene, Toluene, Ethylbenzene, Xylenes

SVOC = Semivolatile Organic Compound

PCDDs= Polychlorinated Dibenzo-p-dioxins

PCDFs= Polychlorinated Dibenzofurans

VOA = Volatile Organic Analysis

HCl = Hydrochloric Acid

oz = ounce

mL = milliliter

L = liter

g = gram

NA = Not applicable because analysis will be completed for groundwater only.